



[K4GSO.us](http://K4GSO.us)

# The Oracle

## Newsletter of the Silver Springs Radio Club

*Oldest Radio Club in Marion County, FL*



September 2021

### Hamfest 2021

Elbert Wilkinson, KQ3K, Chair

As I write this, I can sense the unbridled anticipation of our members for December 4<sup>th</sup>. The excitement is building just like Christmas morning with visions of new rigs, equipment, gadgets, antennas and accessories dancing around in your heads. This is perfectly normal, so don't despair...Hamfest is on the way to the rescue! OK, so much for the drama, but if you've read this far...keep reading.

This will be our third year at First Christian Church. We are truly blessed to be there and that they will have us back. It is a great facility for our Hamfest and our commercial vendors really like it. While in the past we tried to jam as many vendors in as possible, we learned a lesson last year that we don't have to be BIG to be successful. Our commercial vendors will be in the larger church's Memorial Hall. As of this update, all of our loyal commercial vendors, except one, have committed to us. We are waiting on the lone holdout to confirm. If no response, we will open his five tables up to another commercial vendor.

Individual vendors needing indoor space will be placed in the church's Fellowship Hall. Space there is limited with tables for eleven vendors at this time. As a departure from previous years, the raffle cages will be in this room to draw foot traffic. VE testing will also be held in the library just off the Fellowship Hall instead of at Green Clover Hall. The Scout troop at First Christian will be handling our food. Tailgaters will be in the same area as the past two years as will the vendor overnight parking.

To make our Hamfest successful, we need members to step-up and volunteer to help. We need "muscle" on Friday the 3<sup>rd</sup> to help move and arrange vendor tables in both halls. This process goes quickly and if you need to split afterwards, that's OK. The vendors start arriving mid-morning and could also use some help unloading. We need help really early Saturday morning before the masses arrive for the final setup items. So,

## Next Club Meeting

**Tuesday, September 21**

**\*\*\* Green Clover Hall \*\*\***

**319 SE 26th Terrace, Ocala**

**6:00 PM Mentoring & Socializing**

**7:00 PM Meeting**

**Program:** Digital voice mode on VHF/UHF, hot spots, DMR, D-Star, and Yaesu Fusion!

Andy Allen NA4DA & Hayden Kaufman N2HAY

**SSRC Board of Directors** first Tuesday, 7:00 PM, Green Clover Hall

## Upcoming Events

**Nov 9** — **VE Testing, Green Clover Hall, 7:00 PM**

**Hamfest** — **December 4, 2021**  
[Sign up here](#)

## Silver Springs Radio Club Net

**K4GSO Repeater**

**Mondays at 7:30 PM**

**146.610, PL 123-**

where is help needed? Glad you asked: tailgate area, signage placement, parking directors, door watchers, gophers, after event takedown and cleanup. Many hands make for easy work. Last year we didn't have enough workers to staff a club sale items table. A couple of folks willing to man these tables would be a bonus. Once the setup is completed, most will be able to go shop and have fun. The work is not hard but it is time critical.

Please go to the club website to sign-up to help: <https://k4gso.us/hfsu/> Hamfest updates will be given in the September and October General meetings with the final operation plan at the November meeting. This is our opportunity to shine and be Radio Active in the local amateur radio community.

## VE Update

Jim Burgess, KN4MIV

At our July test session, we had 6 candidates test for new licenses or upgrades. All of the candidates were successful in passing at least one test. Here are the results:

K4XRY - Technician (originally KO4SBU) – Kyle Brown

KO4QMK – General – Ronald Lester

KO4QML - Amateur Extra – Gary Yenter

KO4SBV – Technician – Richard Grant

KO4QMM – General – Roger Welker

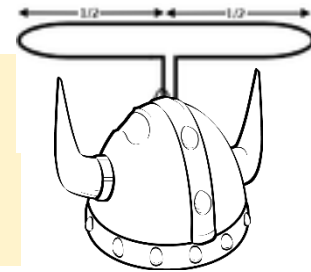
KO4SBW – Technician – Timothy Heath

There were 8 candidates at the September 14th session, and seven passed. We'll have two new Amateur Extras and five new Technicians (although one of the Techs will end up as a General due to previous license credit.) Call signs to follow.

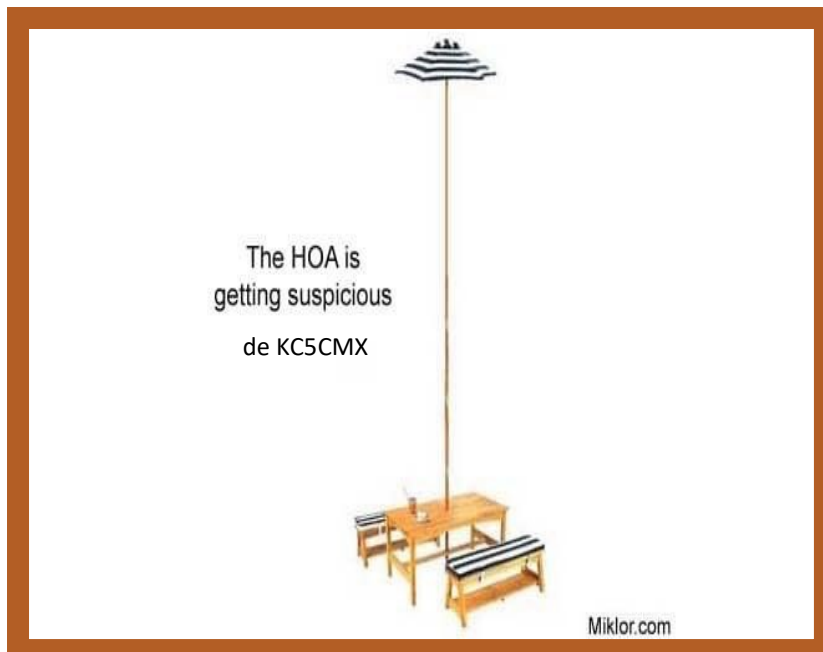
## Tom Lufkin, W4DAX, Asks....

How did the Vikings communicate over long distances?

Answer on last page.....



[This Photo](#) by



## New RF Exposure Rules

By Bert Garcia N8NN

New FCC RF exposure rules for amateur radio became effective May 3, 2021 [1]. The exposure limits did not change; however, previously exempt amateur stations are no longer exempt. All hams are now required to perform an RF exposure evaluation since the current exemptions in the FCC rules are not likely to pertain to a typical ham station. Current ham stations must complete the evaluation by May 3, 2023. Any new ham stations or existing stations that make changes likely to change RF exposure need to conduct an evaluation upon activation [2]. So, if you put up a new antenna or buy a linear amplifier you will need to perform an RF exposure evaluation before May 3, 2023.

ARRL has documents and articles to assist you with your evaluation. Go to the ARRL Home page [3] and enter RF Exposure in the website search box. In particular, References [2], [4], [5], [6], [7], and [8] below are a good place to start reading. A free 316-page book titled *RF Exposure and You* by Ed Hare W1RFI is available online [4]. An online RF Exposure calculator is available [5] with help for Calculator Parameters [6]. A Station Evaluation Worksheet for detailed calculations [7] and an FAQ about RF Exposure [8] are also available.

Phew...! That's a lot of reading. Perhaps some example evaluations of typical ham stations will help you get started with your station. The example results are from the online calculator [5].

**Example 1:** A 100-watt SSB transmitter, a ground mounted vertical, and operating on 40 meters (7.250 MHz). Using the ARRL online calculator [5], enter the Power at Antenna as 100 watts. 100 watts is a "worst-case" assumption since there are losses in your feedline and accessory equipment. For a long coax run you could consider the dB loss in the feedline and use a lower power figure, but to keep it simple and be overly cautious, let's assume the power to be 100 watts at the antenna. Next, select the Mode duty cycle Conversational SSB, no speech processing (You always leave the speech processor off, don't you!). Choose a Transmit duty cycle of 2 minutes on and 2 minutes off. Your ground mounted vertical Antenna Gain is 1.5 dBi from the table in [6]. Check the box for Effects of Ground Reflections, again as a "worst-case" assumption. Press Calculate and you have the results for a "controlled" environment and an "uncontrolled" environment.

Example 1: 100 w, SSB, vertical, 40 meters	Minimum Safe Distance (feet)
Controlled Environment	0.4911
Uncontrolled Environment	0.9822

A controlled environment could be inside a fenced in yard not available to the public. For family members inside the fence, you can inform them to maintain a safe distance from the antenna to comply. An uncontrolled environment is where people are unaware of their exposure. If your yard is not fenced, you can post a warning sign near your antenna.

This example shows that everyone should stay 0.9822 feet (11.7 inches) from your antenna to be safe. If your vertical is roof mounted with no roof access, no one can touch it.

**Example 2:** A 1 KW SSB transmitter, a ground mounted vertical, and operating on 40 meters with the same assumptions as Example 1.

Example 2: 1,000 w, SSB, vertical, 40 meters	Minimum Safe Distance (feet)
Controlled Environment	1.5531
Uncontrolled Environment	3.1061

The uncontrolled minimum safe distance has increased to slightly more than 3 feet with 1,000 watts.

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Example 3: : A 1 KW SSB transmitter, a ground mounted vertical, and operating on 10 meters (28.300 MHz) with the assumptions in Example 1.

Example 3: 1,000 w, SSB, vertical, 10 meters	Minimum Safe Distance (feet)
Controlled Environment	6.0623
Uncontrolled Environment	12.1245

Changing to 10 meters with a 1,000 watt transmitter has increased the safe distance to more than 12 feet from your ground mounted vertical.

Example 4: A 1 KW SSB transmitter, a 3-element yagi antenna, and operating on 10 meters (28.300 MHz) with the assumptions in Example 1.

Example 4: 1,000 w, SSB, vertical, 10 meters	Minimum Safe Distance (feet)
Controlled Environment	12.9609
Uncontrolled Environment	25.9218

If your yagi antenna is mounted higher than 26 feet, you have complied with the exposure limits.

Notice that the effect of going up in frequency will increase the minimum safe distance. Going up in power will increase the minimum safe distance, but not as much. Increasing antenna gain will increase the minimum safe distance.

Here are some results from the online RF Exposure Calculator for typical ham stations:

Band - meters	Mode	Power - watts	Antenna	Controlled*	Uncontrolled*
80	SSB	100	Dipole	4 inches	1 inch
80	RTTY/FT8	100	Dipole	8 inches	15 inches
80	SSB	1000	Dipole	11 inches	21 inches
80	CW	1000	Dipole	15 inches	30 inches
40	SSB	100	Dipole	3 inches	13 inches
40	RTTY/FT8	100	Vertical	13 inches	26 inches
20	SSB	1000	3-el Yagi	7 feet	13 feet
20	RTTY/FT8	1000	3-el Yagi	15 feet	29 feet
10	SSB	1000	3-el Yagi	13 feet	30 feet
10	RTTY/FT8	100	Dipole	5 feet	9 feet
6	FM	100	Vertical	5 feet	9 feet
2	FM	100	Vertical	5 feet	9 feet
1-1/4	FM	50	Vertical	4 feet	8 feet

“\*” – The minimum safe distances have been rounded up for simplicity.

You are responsible for performing an RF Exposure evaluation for your station. Do not rely on this article for compliance. While it is unlikely that the FCC will ask to see your evaluation, if you get into a dispute with your neighbor, one of the first things the FCC may request is your evaluation. Better safe than sorry!

Do not send your RF evaluation to the FCC. Retain your evaluation in your own station records.

You should take RV exposure seriously. Protect yourself and your family members as much as you can.

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## References:

- [1] FCC Docket No. 19-126 <https://docs.fcc.gov/public/attachments/FCC-19-126A1.pdf>
- [2] Updated RF Exposure Rules 04/12/2021  
<http://www.arrl.org/news/updated-radio-frequency-exposure-rules-become-effective-on-may-3>
- [3] ARRL Home page <http://www.arrl.org/>
- [4] *RF Exposure and You* by Ed Hare W1RFI  
<http://www.arrl.org/files/file/Technology/RFsafetyCommittee/RF+Exposure+and+You.pdf>
- [5] RF Exposure Calculator <http://arrrl.org/rf-exposure-calculator>
- [6] Calculator Parameters <http://arrrl.org/rf-exposure-calc-instructions>
- [7] Station Evaluation Worksheet [http://www.arrrl.org/files/file/Technology/RFsafetyCommittee/rfex1\\_2edited.pdf](http://www.arrrl.org/files/file/Technology/RFsafetyCommittee/rfex1_2edited.pdf)
- [8] RFQ about RF Exposure  
<http://www.arrrl.org/files/file/Technology/RFsafetyCommittee/RFXFAQ.pdf>

## PORTABLE POWER BOX

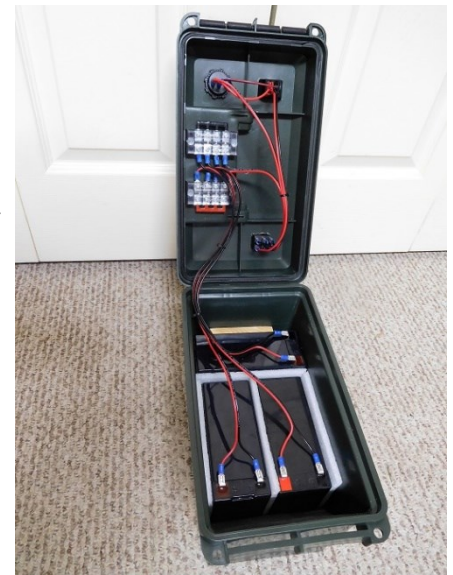
Darrell / KG4CCB

Let me begin by saying that I am fully aware that LifePo4 is the way to go for portable ham radio activities. However, I had three 7-ah sealed lead-acid (SLA) batteries sitting around. Always seeking to get maximum use out of whatever I have, I decided to make use of these batteries before pursuing a LifePo4 purchase. My field operating activities are not day-long activities and the batteries previous use in this capacity has been adequate.

I started with an MTM Case-Gard 50-cal ammo box. Due to very slight size differences the best arrangement was for two to be situated side-by-side lengthwise in the box and the third one perpendicular at the end of the pair. Besides the batteries, I perceived a need for only a volt/ammeter, a means to get 12-volts out and a charging source in and since I didn't want to run the charging source in thru the volt/ammeter backwards, I included a DPDT switch with center off to direct the battery input / output. The round volt/ammeter hole was easy enough with a hole cutter bit but the rectangular holes for the dual Anderson Power Pole outlet and the rocker switch were a little more challenging. In the end I used a kitchen paring knife my wife had recently discarded (and I scarfed up for some then unknown potential future use). The knife worked surprisingly well cutting through the plastic case and the holes required only some minor trimming with a file.

The batteries are connected in parallel through two terminal strips which are bolted to the box cover. The batteries simply set in the bottom of the box and are secured from side-to-side movement by pieces of foam padding and a few pieces of wood, all of which was just the right size and dimensions. Hah, clean living pays off!

The batteries are not new, and their remaining life is unknown, but as they will not get heavy or frequent use they should last for a while. When they bite the dust, I will ponder replacing them in-kind, or graduate to LifePo4. If anyone has a recommendation for a more professional method of labeling, please let me know.





## Big Performance, Small Package – QCX-mini

Bert Garcia N8NN

Last year I built the QCX 5-watt CW transceiver from QRP Labs and was astounded by the exceptional performance [1] [2]. The designer and owner of QRP Labs, Hans Summers G0UPL, re-designed the QCX transceiver into a tiny package as the QCX-mini while keeping the same feature-packed circuit design and software. The QCX-mini is a single-band transceiver perfect for portable operations with its small size, light weight at 7 ounces, and low power consumption. Choose one band from 80, 60, 40, 30, 20, 17 meters.

You get digital readout with two VFO's, split operation, RIT, programmable CW offset, 12 frequency memories, built-in Iambic CW keyer with 12 text memories, 200 Hz CW filter, on-screen CW decoder, full QSK or semi-break in, on-screen real time clock, battery monitor, and an S-meter. WSPR and CW beacon modes are built-in, and you can plug in a GPS receiver for WSPR time, location, and frequency calibration. The high-performance receiver has more than 50 dB of unwanted sideband suppression, and the 200 Hz filter has no ringing. You can use a computer for CAT control. A computer is not required to align or operate the transceiver.

The QCX-mini kit is \$55 from QRP Labs plus \$20 for the optional metal case [3]. An optional TCXO is available for \$8.25 to maintain frequency accuracy to +/- 0.25 ppm for WSPR. A 121-page assembly manual and a 52-page instruction manual are available for download. An optional 50-watt amplifier is available for \$29.50 plus \$16 for the metal case [4].

Figure 1 shows my 20-meter version and the 40-meter version that I built. Note the small size! I'm holding two transceivers in one hand.



Figure 1: My 20-meter and 40-meter QCX-mini's.

The QCX-mini is built on three double-sided circuit boards – a main board, display board and controls board. The surface mount components are factory installed, so you only need to solder the through-hole components. Perhaps the most tedious task is winding the four small toroids. Because of the very close tolerances in the tiny case, care must be taken to follow the instructions closely and to solder carefully. It took me about 10 hours to assemble and align the QCX-mini. All the alignment tools are on the main board, so you don't need any external instruments.

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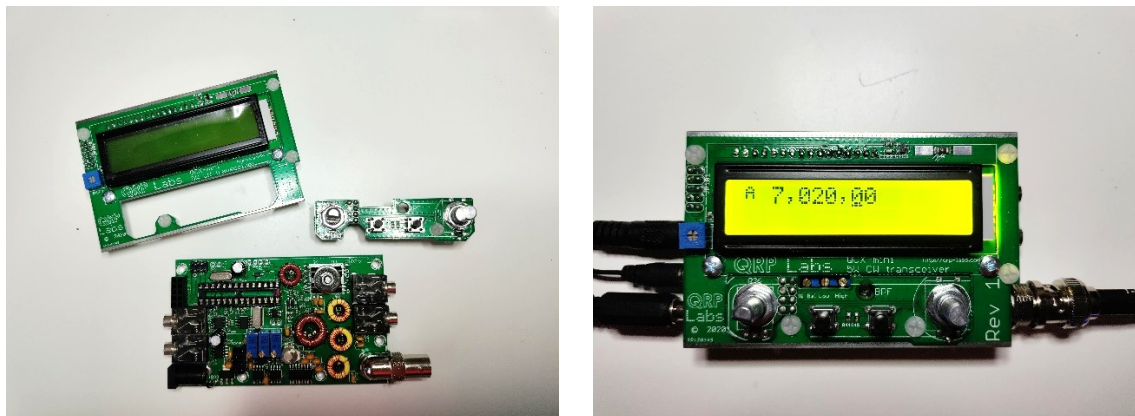


Figure 3: Three circuit boards, *left*; assembled and powered up, *right*.

Even now at the bottom of the sunspot cycle, I am able to work DX in Europe and South America with the QCX-mini and an end-fed wire antenna. QSOs around the US are routine. There's a lot of fun packed into this little rig!

#### References:

1. *Bang for the Buck – QCX QRP CW Transceiver*, Bert Garcia N8NN, QST NFL Newsletter, October 2020, page 9, <https://arrl-nlf.org>.
2. *Bang for the Buck – QCX QRP CW Transceiver*, Bert Garcia N8NN, The Oracle, October 2020, page 11, <https://k4gso.us>.
3. QRP Labs, <http://grp-labs.com>.
4. *QRP Labs 50-watt HF Amplifier*, Bert Garcia N8NN, QST NFL Newsletter, December 2020, page 8, <https://arrl-nfl.org>.

## SSRC Information

### 2021 SSRC Officers

President— Bill Gillespie, KW5BG  
Vice President— Jim Burgess, KN4MIV  
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Treasurer— Tom Lufkin, W4DAX  
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Membership Application  
Buy/Sell/Trade  
QST NFL – NFL Section Newsletter  
Silver Springs Radio Club Website  
NFL Section Website  
WA7BNM Contest Calendar  
NG3K DX

Club Minutes and  
Financial Reports

Answer to riddle on page 2: Norse Code